MAKEMONEY.COM
WELDING
FOR BEGINNER WELDERS

By Garrett Strong

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MIG Welding Mastery

Hi and thanks for downloading ***"MIG Welding Mastery"***

My name is Garrett Strong, owner of MakeMoneyWelding.com.

In the following pages I'm going to give you a detailed walk-through of how to start laying your first weld beads with your MIG welder, so you can get started welding your first project as soon as possible.

I was a beginner welder 8 years ago and now I want to share with you the tips, techniques, and strategies I've learned about how to make great welds with your MIG welder, and ultimately how to make lots of money doing it.

If you have any questions you can contact me at Garrett@MakeMoneyWelding.com

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MIG Welding Basics

If you're brand new to MIG welding, MIG stands for **Metal Inert Gas**. It's an arc welding process that uses a constant feeding wire as the welding electrode.

You can choose to either use gas with your mig welder (this is why it's called metal inert gas), or you can use flux core wire that doesn't require shielding gas.

The shielding gas simply acts to protect the weld puddle from the atmosphere which can cause damage to the weld.

The wire for a MIG welder comes on a spool and is placed inside the MIG welding machine.

When you first setup your MIG machine you'll have to feed this wire through the rollers. These rollers clamp down on the wire and feed it out through the MIG gun.

As far as setup goes, that's about all there is to setting up a MIG welder, and that's why they're so great for beginners.

You can see the wire spool in this image, and if you look closely you'll see the wire being fed into the rollers. Once it reaches the end of the MIG gun, it melts and becomes the actual weld bead.

MIG welding is similar to stick welding in that you must ground the work piece with the ground clamp before you start the weld.

The process of MIG welding is much faster than stick welding because you have a continuous wire being fed, and you don't have to stop and change out spent electrodes.

The MIG welding method was popularized in industry when manufacturers needed a fast method of welding.

MIG welding is by far the easiest way to start welding due to its simplicity. Besides some metal fit up and preparation, you are ready to weld with a MIG welder right out of the box.

There are 2 types of MIG welding processes. The first is called FCAW (Flux Core Arc Welding), and the second is called GMAW (Gas Metal Arc Welding).

FCAW (Flux Core Arc Welding)

Flux core arc welding uses a welding wire with the flux inside the wire. So, unlike using a stick welding electrode where the flux is on the outside, with FCAW the flux is on the inside of the wire.

Like stick welding, this flux produces a protectant slag that has to be chipped away after the weld has been made.

Below are two pictures showing completed welds. The one on the left has a flux coating that needs to be chipped away.

Unlike the MIG (Metal Inert Gas, a.k.a. GMAW) process, the flux core arc welding process can be used in windy conditions because there is no shielding gas to get blown away.

If you did try to use the gas metal arc welding process in the wind, it would blow away your shielding gas and you would end up with porosity in your welds. (See bottom weld)

GMAW (Gas Metal Arc Welding)

The gas metal arc welding process uses a solid wire with no flux. It uses a shielding gas to protect the weld puddle. It produces nicer welds with less weld spatter than FCAW, and it's better suited for welding in a shop with low winds.

This process involves using a gas cylinder with a CO2/Argon mix to shield the weld puddle from the atmosphere. There is no slag to chip off the weld with this process, and it makes an overall prettier weld.

Once the gas flow pressure has been set on the cylinder regulator, you're good to go.

All you have to do is aim the welding wire where you want it and squeeze the trigger. This does two things. It feeds the wire out of the machine, and it blows shielding gas into the weld puddle.

Overall, I would say that if you're just starting out then buying a MIG welder that will perform both GMAW and FCAW is a good start.

Anyone, and I mean anyone can learn to MIG weld in an afternoon.

The new MIG machines on the market today make it so simple to MIG weld because all you have to do is aim the MIG gun, pull the trigger, and you're welding.

Of course, there are some other things you'll need to know like welding joints, welding positions, etc.

But, if you pick up a stick welder and try to start welding you're going to be struggling to even lay a bead for a few days because stick welders are extremely difficult to start your weld if you're a beginner.

How To Lay A Perfect MIG Weld

Below I've got 2 pieces of metal I'll be running a bead across. You can see I've taken the time to grind the mill scale of the metal before welding.

The reason you do that is because the weld puddle runs much smoother.

The thing to keep in mind when running a MIG weld bead is gun angle. Remember to always keep your gun angled at about a 15 degree angle, and move the weld puddle forward at a rate of about 1 inch every 5 seconds.

One of the most common mistakes beginners make is trying to rush the weld puddle. Remember, you want to weld as hot as you can without burning through you material.

If your weld bead looks long and skinny like below, it means you're going too fast.

You need to slow down and take your time.

When you're finished with your weld bead, it should look something like this.

Overview Of Welding Processes

When I first began welding about 8 years ago I wasn't quite sure what I had gotten myself into. I started out with an oxy acetylene setup, and if you've ever oxy/fuel welded you know how difficult it is.

My weld beads were very sloppy, and most of the time my welds just ended up cracking when tested because I couldn't control the heat from the torch tip.

I continued to practice for many more hours until I got it down. Now, I can lay a weld bead with absolute precision every time with any welding process because I learned how to control the heat.

Welding is the process of joining two metals together. You can weld steel (also known as mild steel), stainless steel, aluminum, titanium, and more.

What you can't do is weld two pieces of metal together without actually penetrating the work piece. What I mean is that although you can make two pieces of metal stick together with an inexpensive welding machine, your welds will only be as strong and as aesthetic as your skill level will allow.

I started out doing it this way and I learned the hard way that in order to make long lasting, beautiful welds you have to take the time to not only practice, but also to clean and fit up the metal for welding.

Sloppy Weld

Nice Weld

There are a lot of bad habits you will likely make that are hard to unlearn if you start out welding the wrong way.

Overview: Welding and brazing

Welding is the process of joining 2 metals together by heating them up to molten hot temperatures, and then manipulating the molten weld puddle to create a weld bead.

That's just the beginning of making a weld though. A lot is involved with welding like metal cleaning, fit up, cutting, making measurements, making sure you're using the correct welding processes, and much more.

Controlling the liquid weld puddle is where lots of practice comes into play.

The heat required to get mild steel to its melting point is around 2700 °F. Each welding process heats the metal to a different temperature.

For example, the heat created from an oxy acetylene torch tip is around 6300 °F, which is plenty of heat to melt the steel.

Arc welding produces a heat at the electrode tip of around 6,000 to 10,000 °F.

I'm going to cover the different welding processes here and tell you what the uses and benefits of each process are.

Blacksmithing

Before there were any arc welding processes or oxy acetylene gases to heat up the metal, there were blacksmiths.

Blacksmiths had to heat up the metal using a heating forge, and rather than bring the metal to a liquid temperature and weld it, they had to hammer the steel together.

This process fused the metal together, and it's called forge welding. Up until the mid-1800's most welding was done this way.

Even though this process is long and arduous, it's still the same exact concept as gas welding or arc welding.

Essentially you're joining 2 metals together.

Oxy Acetylene Welding

Oxy acetylene welding was developed and used from the mid to late 1800's. This process involves mixing oxygen with acetylene which produces a flame that burns very hot.

Oxy acetylene welding uses high pressure gas cylinders that contain the two gases oxygen and acetylene. The gases are able to be mixed and used for welding through the use of regulators, hoses, the torch mixer, and welding tips.

After turning on the gases and lighting them, they must be adjusted for the correct flame to weld properly.

You must direct the flame at the weld joint and use a filler rod to help make the weld bead.

Now, I may have simplified that a bit because there are a few more steps to oxy acetylene welding. For one you have to choose the proper welding tip for the metal thickness you're working with.

You have to use a bigger tip for thicker metal, and a smaller tip for thinner metal.

You also have to adjust the regulator pressures to deliver the right amount of gases at the welding tips. If you have the pressures set wrong you may over heat the metal, or not heat it up enough to start the weld.

Oxy acetylene is a slow welding process since it takes time for the flame to heat the metal to molten temperature.

When working with mild steel over ¼" inch thick, it's best to just avoid using the oxy acetylene process altogether since it just takes too long, and the heat affected area is too large.

Arc welding has essentially taken the place of oxy acetylene welding since it's come into use. Arc welding is much faster, much more efficient, and produces better welds. You can also weld thicker metals with the arc welding process.

Oxy Acetylene Brazing

Brazing is the process of joining 2 metals together using a brass filler rod, and often dissimilar metals without actually melting the base metals.

Most metal types can be brazed. For instance, you can braze copper, stainless steel, brass, mild steel, cast iron, bronze, galvanized steel, and more.

And with brazing you can join different metals with each other. You could join brass and copper together, steel to copper, etc.

Brazing is a good process because it requires much less heat to perform than does welding, which results in less metal warpage. This is why brazing is popular to use in automotive sheet metal.

It takes about 2,700°F to melt steel, but when you're brazing you are only heating the metal to around 1,000°F.

Brazing typically involves using a brass filler rod with a flux to remove surface impurities and provide a good adhesion of the two metals.

Many people think that since

you're not actually melting the two metals together, but rather joining the two pieces of metal with a brass filler rod that adheres to the metals, that the brazed joint isn't as strong.

However, in many cases during pull tests the steel will break before the actual brazed joint breaks.

Arc Welding (stick)

Arc welding is the process of joining 2 metals together using an electrode as the filler rod, and an electric arc to melt the metal.

Arc welding or "stick welding" as it's referred, uses a flux covered rod to weld with. Flux is a chemical coating that's used when welding to protect the liquid weld puddle from atmospheric gases like nitrogen and oxygen.

If you attempt to arc weld without a flux covered welding rod your welds will come out weak and full of porosity.

"Porosity" is when you get lots of holes in your weld from not having an atmospheric shielding agent like flux when welding.

You can weld many different metals with an arc welder. For instance, you can weld stainless steel, bronze, aluminum, mild steel, and cast iron.

You just have to make sure you're using the correct stick electrode for whichever metal you're welding. If you're welding steel then you will use a steel electrode, and the same goes for every type of metal you're welding.

The process of welding with an arc welder starts by choosing the correct electrode. Once the electrode has been chosen, the next step is to ground your work piece.

The weld cannot begin until you've grounded the work piece with your ground clamp.

Now you can turn on the machine, set your machines output level, and strike the arc.

Once the arc is started you will see a molten puddle form. Your job is to control this puddle and make it go where you want it to.

Since you'll just be learning, it's important to practice running

many weld beads in the flat position before you attempt to make any weld joints.

TIG Welding

TIG welding (tungsten inert gas) is the Cadillac of the welding processes. You can produce the most beautiful welds by using a TIG welder.

TIG is an extremely accurate welding process. You can weld extremely thin metals together like 2 coke cans or 2 razor blades using TIG. You can successfully weld very thin metals to very thick metals because TIG welding doesn't heat up a large area of the work piece.

TIG welding uses a torch with a solid tungsten electrode, an argon shielding gas, and a filler rod that gets dipped into the weld puddle. TIG is very similar to oxy acetylene welding since both use a filler rod to dip into the weld puddle.

However, with TIG you can weld steel, stainless steel, aluminum, titanium, magnesium, and more.

TIG uses a foot pedal to control the heat of the torch. You push forward for more heat and push back to reduce heat. The TIG process creates a lot of heat at the torch and can become uncomfortable to hold, so manufacturers make TIG welders with water cooling systems built in.

TIG is an advanced welding process that you probably want stay away from until you've mastered the MIG and arc welding processes.

Cutting Torch

When you begin working with metal you are no doubt going to have a very difficult time if you don't have a way to bend or cut steel. That's where the oxy acetylene torch comes into play.

You can do so many cool things with an oxy acetylene torch and you'll find that it's one of the most important tools in your arsenal.

The oxy acetylene torch can be used to cut circles, cut out patterns you've drawn, cut steel to length, cut very thick steel, heat metal to be bent, and many other uses.

If you learn to gas weld first with a gas welding tip, then you'll find that using a cutting torch is pretty simple. The same principles apply, except that with oxy acetylene cutting you're using a solid stream of oxygen to burn off (oxidize) the metal to be cut.

All you need to start is a set of oxygen and acetylene cylinders. You can buy these at your local welding supplier. You will also need a cutting torch, a set of oxygen and acetylene regulators, an oxy acetylene hose to provide gas from the cylinders to the torch, a striker to light the torch, and some welding goggles with a #5 shade.

You don't need a welding mask when cutting with oxy acetylene because the flame from an oxy acetylene torch doesn't emit damaging ultraviolet light like an arc welder.

Although you can purchase this equipment on your own and get started quickly, it's still pretty nerve racking the first time you light the torch. The oxy acetylene setup is by far the most dangerous tool in your shop since you're dealing with highly pressurized gas.

I'm not trying to scare you, but follow all safety precautions and have a healthy respect for this tool.

Safety

Ear Protection

Any time you're using a grinder, band saw, drill press, cut off wheel, or any other tool that makes a lot of noise you need to make sure you're using ear plugs.

It's not worth it to constantly damage you're ear drums by not using hearing protection. You only get one set of ears and if you don't protect them from constant loud noises, you won't have an ear drum left when you're older.

So, take the time and make it a habit to always put ear plugs in before using anything in your shop that makes loud noise. If you don't like using ear plugs you can use a gun range style ear muff.

Eye Protection

You can't talk about welding without talking about eye protection. This is the single most important thing you must make sure you have before you begin welding.

It's impossible to weld without a welding mask because the arc is extremely bright. Plus, you can't see the weld puddle without it. The welding mask is kept very dark until the light of the arc hits it. Once you begin your weld you'll be able to clearly see what is going on in the weld puddle.

There are many different masks on the market. Some are cheaper and some are more expensive, but they all work the same way. They block the damaging light that the arc emits, and they allow you to see the weld.

I've got a cheap mask that I bought for around $70, but some masks sell for up to $350. It's all up to how much you want to

spend. I have an auto darkening mask so that I can see the work piece through the lens before I strike the arc.

If you're on a budget I would recommend one of the cheap masks because for the price they do exactly what they're supposed to do… protect your eyes and skin from the damaging ultraviolet light.

Welding Cylinder Safety

I briefly talked about welding cylinders earlier, but I wanted to mention a couple more very important things.

The gas cylinders you'll be using, whether it's an oxygen cylinder or and argon/CO2 cylinder, are under very high pressure. When you get a full cylinder from your local welding supplier ALWAYS make sure the cap stays screwed on tightly until you get it chained up in a secure location.

NEVER leave a high pressure cylinder just standing upright out in the open. If the cylinder gets knocked over and the valve gets damaged, the cylinder will take off like a rocket.

I've seen actual footage of high pressure gas cylinders that were damaged take off into the air like a missile.

As I mentioned before, you don't need to be scared to use high pressure cylinders, just have a healthy respect for them and treat them with care.

Welding Hat and Jacket

When welding or cutting you should wear cotton or leather clothes. Any type of synthetic material is unacceptable and will actually stick to your skin if you get a hot spark on you.

Sparks will fly when you're making a weld, so you should wear a long sleeve shirt, blue jeans, and leather boots. Wearing tennis shoes is also unacceptable.

There are leather and cotton welding jackets available and you should consider buying one to keep the sparks from burning your skin. Wearing a welding hat is not required but if you're welding overhead, or in a position where

sparks are falling on you, it's a good idea to wear a welding hat to keep your head from getting burned.

The Cheapest & Easiest Way To Get Started

I always recommend that if you want to get started welding, the cheapest and best way to get started is with a MIG welder.

The small and inexpensive 140 amp MIG welders are perfect for beginners. Hobart makes a 140 MIG that comes fully prepared to weld right out of the box. Plus, it plugs directly into any household 110 volt outlet.

You can weld up to 3/16" steel in one pass with a 140 amp MIG welder, and they're perfect for beginner projects. They're easy to set up and get started the day you get it.

All of the low priced wire feed welders will be able to weld with flux core wire, but make sure the welder has the ability to hook up a gas cylinder so you can use it as a true MIG welder. You'll be very disappointed if you buy a wire feed welder that only has flux core capability.

You'll quickly discover that you'll want the ability to weld with gas because of the cleaner weld appearance.

Congratulations, You're On Your Way!

You're now on your way to becoming a great welder and starting that first project! If you really want to mastery MIG welding in an online, step-by-step video training format, then checkout my online training course 90 Minute MIG Mastery.

➔Click here to learn more about 90 Minute MIG Mastery

Here's everything you get…

- **Module 1:** Intro To Welding
- **Module 2:** Intro To Gas Metal Arc Welding (GMAW)
- **Module 3:** Controlling The Weld Puddle
- **Module 4:** Intro To Flux Core Arc Welding
- **Module 5:** Intro To The Welding Positions
- **Module 6:** Intro To Welding Joints

- **PLUS All 7 Bonuses (A $197 Value)**

Regards,

Garrett